SEQUENCE LISTING

<110> Tartaglia, Louis A.
Weng, Xun

<120> Nucleic Acid Molecules Encoding GLUTX
and Uses Thereof

<130> MPI1998-021DV3

<140> US 09/981,947
<141> 2001-10-18

<150> 09/610,417
<151> 2000-07-05

<150> 09/299,549
<151> 1999-04-26

<150> 09/031,392
<151> 1998-02-26

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tcactgagac cc atg gca agg aaa caa aat agg aat tcc aag gaa ctg ggc 111
Met Ala Arg Lys Gln Asn Arg Asn Ser Lys Glu Leu Gly
1 5 10

cta gtt ccc ctc aca gat gac acc agc cac gcc ggg cct cca ggg cca 159
Leu Val Pro Leu Thr Asp Asp Thr Ser His Ala Gly Pro Pro Gly Pro
15 20 25

ggg agg gca ctg ctg gag tgt gac cac ctg agg agt ggg gtg cca ggt 207
Gly Arg Ala Leu Leu Glu Cys Asp His Leu Arg Ser Gly Val Pro Gly
30 35 40 45

gga agg aga aga aag gac tgg tcc tgc tcg ctc ctc gtg gcc tcc ctc 255
Gly Arg Arg Arg Lys Asp Trp Ser Cys Ser Leu Leu Val Ala Ser Leu
50 55 60

gcg ggc gcc ttc ggc tcc tcc ttc ctc tac ggc tac aac ctg tcg gtg 303

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Ala Gly Ala Phe Gly Ser Ser Phe Leu Tyr Gly Tyr Asn Leu Ser Val
            65                  70                  75

gtg aat gcc ccc acc ccg tac atc aag gcc ttt tac aat gag tca tgg   351
Val Asn Ala Pro Thr Pro Tyr Ile Lys Ala Phe Tyr Asn Glu Ser Trp
        80                  85                  90

gaa aga agg cat gga cgt cca ata gac cca gac act ctg act ctg ctc   399
Glu Arg Arg His Gly Arg Pro Ile Asp Pro Asp Thr Leu Thr Leu Leu
    95                  100                 105

tgg tct gtg act gtg tcc ata ttc gcc atc ggt gga ctt gtg ggg acg   447
Trp Ser Val Thr Val Ser Ile Phe Ala Ile Gly Gly Leu Val Gly Thr
110                 115                 120                 125

tta att gtg aag atg att gga aag gtt ctt ggg agg aag cac act ttg   495
Leu Ile Val Lys Met Ile Gly Lys Val Leu Gly Arg Lys His Thr Leu
                130                 135                 140

ctg gcc aat aat ggg ttt gca att tct gct gca ttg ctg atg gcc tgc   543
Leu Ala Asn Asn Gly Phe Ala Ile Ser Ala Ala Leu Leu Met Ala Cys
            145                 150                 155

tcg ctc cag gca gga gcc ttt gaa atg ctc att gtg gga cgc ttc atc   591
Ser Leu Gln Ala Gly Ala Phe Glu Met Leu Ile Val Gly Arg Phe Ile
        160                 165                 170

atg ggc ata gat gga ggc gtc gcc ctc agt gtg ctc ccc atg tac ctc   639
Met Gly Ile Asp Gly Gly Val Ala Leu Ser Val Leu Pro Met Tyr Leu
    175                 180                 185

agt gag atc tca ccc aag gag atc cgt ggc tct ctg ggg cag gtg act   687
Ser Glu Ile Ser Pro Lys Glu Ile Arg Gly Ser Leu Gly Gln Val Thr
190                 195                 200                 205

gcc atc ttt atc tgc att ggc gtg ttc act ggg cag ctt ctg ggc ctg   735
Ala Ile Phe Ile Cys Ile Gly Val Phe Thr Gly Gln Leu Leu Gly Leu
                210                 215                 220

ccc gag ctg ctg gga aag gag agt acc tgg cca tac ctg ttt gga gtg   783
Pro Glu Leu Leu Gly Lys Glu Ser Thr Trp Pro Tyr Leu Phe Gly Val
            225                 230                 235

att gtg gtc cct gcc gtt gtc cag ctg ctg agc ctt ccc ttt ctc ccg   831
Ile Val Val Pro Ala Val Val Gln Leu Leu Ser Leu Pro Phe Leu Pro
        240                 245                 250

gac agc cca cgc tac ctg ctc ttg gag aag cac aac gag gca aga gct   879
Asp Ser Pro Arg Tyr Leu Leu Leu Glu Lys His Asn Glu Ala Arg Ala
    255                 260                 265

gtg aaa gcc ttc caa acg ttc ttg ggt aaa gca gac gtt tcc caa gag   927
Val Lys Ala Phe Gln Thr Phe Leu Gly Lys Ala Asp Val Ser Gln Glu
270                 275                 280                 285

gta gag gag gtc ctg gct gag agc cac gtg cag agg agc atc cgc ctg   975
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Val Glu Glu Val Leu Ala Glu Ser His Val Gln Arg Ser Ile Arg Leu
                290                 295                 300

gtg tcc gtg ctg gag ctg ctg aga gct ccc tac gtc cgc tgg cag gtg   1023
Val Ser Val Leu Glu Leu Leu Arg Ala Pro Tyr Val Arg Trp Gln Val
            305                 310                 315

gtc acc gtg att gtc acc atg gcc tgc tac cag ctc tgt ggc ctc aat   1071
Val Thr Val Ile Val Thr Met Ala Cys Tyr Gln Leu Cys Gly Leu Asn
        320                 325                 330

gca att tgg ttc tat acc aac agc atc ttt gga aaa gct ggg atc cct   1119
Ala Ile Trp Phe Tyr Thr Asn Ser Ile Phe Gly Lys Ala Gly Ile Pro
    335                 340                 345

ccg gca aag atc cca tac gtc acc ttg agt aca ggg ggc atc gag act   1167
Pro Ala Lys Ile Pro Tyr Val Thr Leu Ser Thr Gly Gly Ile Glu Thr
350                 355                 360                 365

ttg gct gcc gtc ttc tct ggt ttg gtc att gag cac ctg gga cgg aga   1215
Leu Ala Ala Val Phe Ser Gly Leu Val Ile Glu His Leu Gly Arg Arg
                370                 375                 380

ccc ctc ctc att ggt ggc ttt ggg ctc atg ggc ctc ttc ttt ggg acc   1263
Pro Leu Leu Ile Gly Gly Phe Gly Leu Met Gly Leu Phe Phe Gly Thr
            385                 390                 395

ctc acc atc acg ctg acc ctg cag gac cac gcc ccc tgg gtc ccc tac   1311
Leu Thr Ile Thr Leu Thr Leu Gln Asp His Ala Pro Trp Val Pro Tyr
        400                 405                 410

ctg agt atc gtg ggc att ctg gcc atc atc gcc tct ttc tgc agt ggg   1359
Leu Ser Ile Val Gly Ile Leu Ala Ile Ile Ala Ser Phe Cys Ser Gly
    415                 420                 425

cca ggt ggc atc ccg ttc atc ttg act ggt gag ttc ttc cag caa tct   1407
Pro Gly Gly Ile Pro Phe Ile Leu Thr Gly Glu Phe Phe Gln Gln Ser
430                 435                 440                 445

cag cgg ccg gct gcc ttc atc att gca ggc acc gtc aac tgg ctc tcc   1455
Gln Arg Pro Ala Ala Phe Ile Ile Ala Gly Thr Val Asn Trp Leu Ser
                450                 455                 460

aac ttt gct gtt ggg ctc ctc ttc cca ttc att cag aaa agt ctg gac   1503
Asn Phe Ala Val Gly Leu Leu Phe Pro Phe Ile Gln Lys Ser Leu Asp
            465                 470                 475

acc tac tgt ttc cta gtc ttt gct aca att tgt atc aca ggt gct atc   1551
Thr Tyr Cys Phe Leu Val Phe Ala Thr Ile Cys Ile Thr Gly Ala Ile
        480                 485                 490

tac ctg tat ttt gtg ctg cct gag acc aaa aac aga acc tat gca gaa   1599
Tyr Leu Tyr Phe Val Leu Pro Glu Thr Lys Asn Arg Thr Tyr Ala Glu
    495                 500                 505

atc agc cag gca ttt tcc aaa agg aac aaa gca tac cca cca gaa gag   1647
```

```
Ile Ser Gln Ala Phe Ser Lys Arg Asn Lys Ala Tyr Pro Pro Glu Glu
510                 515                 520                 525

aaa atc gac tca gct gtc act gat gct cct gct tct tct cct ttc act   1695
Lys Ile Asp Ser Ala Val Thr Asp Ala Pro Ala Ser Ser Pro Phe Thr
                530                 535                 540

act ccg aat aca gcc tgg att caa gct gcc gcc acc acc acc gcc acc   1743
Thr Pro Asn Thr Ala Trp Ile Gln Ala Ala Ala Thr Thr Thr Ala Thr
            545                 550                 555

aaa aaa gaa cac cca ttg taa acggtcatgt ggtatttcct caacctggaa      1794
Lys Lys Glu His Pro Leu  *
        560

tgaccttccc ctatcttctt ctcctggaga acaccaagtc atgatgtcag acaagagctt 1854
ggattttgga gacatgggtt tgaattccag tcattcattc ttttattcag caaatattta 1914
acaagtactg acatgtccca tatgttgttt tacccactgg ttatacaatg ggagggagag 1974
agagagagag agagagagag agatgctatt ctaaaagctt gaagtctagg ctgtgcacgg 2034
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aatggcgtga acccaggagg cggagcttgc agtgagccga gatcacacca ccacactcca 2274
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<212> PRT
<213> Human

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Met Ala Arg Lys Gln Asn Arg Asn Ser Lys Glu Leu Gly Leu Val Pro
 1               5                  10                  15
Leu Thr Asp Asp Thr Ser His Ala Gly Pro Pro Gly Pro Gly Arg Ala
            20                  25                  30
Leu Leu Glu Cys Asp His Leu Arg Ser Gly Val Pro Gly Gly Arg Arg
        35                  40                  45
Arg Lys Asp Trp Ser Cys Ser Leu Leu Val Ala Ser Leu Ala Gly Ala
    50                  55                  60
Phe Gly Ser Ser Phe Leu Tyr Gly Tyr Asn Leu Ser Val Val Asn Ala
65                  70                  75                  80
Pro Thr Pro Tyr Ile Lys Ala Phe Tyr Asn Glu Ser Trp Glu Arg Arg
                85                  90                  95
His Gly Arg Pro Ile Asp Pro Asp Thr Leu Thr Leu Leu Trp Ser Val
            100                 105                 110
Thr Val Ser Ile Phe Ala Ile Gly Gly Leu Val Gly Thr Leu Ile Val
        115                 120                 125
Lys Met Ile Gly Lys Val Leu Gly Arg Lys His Thr Leu Leu Ala Asn
    130                 135                 140
Asn Gly Phe Ala Ile Ser Ala Ala Leu Leu Met Ala Cys Ser Leu Gln
145                 150                 155                 160
Ala Gly Ala Phe Glu Met Leu Ile Val Gly Arg Phe Ile Met Gly Ile
                165                 170                 175
Asp Gly Gly Val Ala Leu Ser Val Leu Pro Met Tyr Leu Ser Glu Ile
            180                 185                 190
```

```
Ser Pro Lys Glu Ile Arg Gly Ser Leu Gly Gln Val Thr Ala Ile Phe
        195                 200                 205
Ile Cys Ile Gly Val Phe Thr Gly Gln Leu Leu Gly Leu Pro Glu Leu
    210                 215                 220
Leu Gly Lys Glu Ser Thr Trp Pro Tyr Leu Phe Gly Val Ile Val Val
225                 230                 235                 240
Pro Ala Val Val Gln Leu Leu Ser Leu Pro Phe Leu Pro Asp Ser Pro
                245                 250                 255
Arg Tyr Leu Leu Leu Glu Lys His Asn Glu Ala Arg Ala Val Lys Ala
            260                 265                 270
Phe Gln Thr Phe Leu Gly Lys Ala Asp Val Ser Gln Glu Val Glu Glu
        275                 280                 285
Val Leu Ala Glu Ser His Val Gln Arg Ser Ile Arg Leu Val Ser Val
    290                 295                 300
Leu Glu Leu Leu Arg Ala Pro Tyr Val Arg Trp Gln Val Val Thr Val
305                 310                 315                 320
Ile Val Thr Met Ala Cys Tyr Gln Leu Cys Gly Leu Asn Ala Ile Trp
                325                 330                 335
Phe Tyr Thr Asn Ser Ile Phe Gly Lys Ala Gly Ile Pro Pro Ala Lys
            340                 345                 350
Ile Pro Tyr Val Thr Leu Ser Thr Gly Gly Ile Glu Thr Leu Ala Ala
        355                 360                 365
Val Phe Ser Gly Leu Val Ile Glu His Leu Gly Arg Arg Pro Leu Leu
    370                 375                 380
Ile Gly Gly Phe Gly Leu Met Gly Leu Phe Phe Gly Thr Leu Thr Ile
385                 390                 395                 400
Thr Leu Thr Leu Gln Asp His Ala Pro Trp Val Pro Tyr Leu Ser Ile
                405                 410                 415
Val Gly Ile Leu Ala Ile Ile Ala Ser Phe Cys Ser Gly Pro Gly Gly
            420                 425                 430
Ile Pro Phe Ile Leu Thr Gly Glu Phe Phe Gln Gln Ser Gln Arg Pro
        435                 440                 445
Ala Ala Phe Ile Ile Ala Gly Thr Val Asn Trp Leu Ser Asn Phe Ala
    450                 455                 460
Val Gly Leu Leu Phe Pro Phe Ile Gln Lys Ser Leu Asp Thr Tyr Cys
465                 470                 475                 480
Phe Leu Val Phe Ala Thr Ile Cys Ile Thr Gly Ala Ile Tyr Leu Tyr
                485                 490                 495
Phe Val Leu Pro Glu Thr Lys Asn Arg Thr Tyr Ala Glu Ile Ser Gln
            500                 505                 510
Ala Phe Ser Lys Arg Asn Lys Ala Tyr Pro Pro Glu Glu Lys Ile Asp
        515                 520                 525
Ser Ala Val Thr Asp Ala Pro Ala Ser Ser Pro Phe Thr Thr Pro Asn
    530                 535                 540
Thr Ala Trp Ile Gln Ala Ala Ala Thr Thr Thr Ala Thr Lys Lys Glu
545                 550                 555                 560
His Pro Leu
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<210> 3
<211> 383
<212> PRT
<213> Human

<400> 3

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Met Gly Phe Ser Lys Leu Gly Lys Ser Phe Glu Met Leu Ile Leu Gly
 1               5                  10                  15
Arg Phe Ile Ile Gly Val Tyr Cys Gly Leu Thr Thr Gly Phe Val Pro
            20                  25                  30
Met Tyr Val Gly Glu Val Ser Pro Thr Glu Leu Arg Gly Ala Leu Gly
        35                  40                  45
Thr Leu His Gln Leu Gly Ile Val Val Gly Ile Leu Ile Ala Gln Val
    50                  55                  60
Phe Gly Leu Asp Ser Ile Met Gly Asn Gln Glu Leu Trp Pro Leu Leu
65                  70                  75                  80
Leu Ser Val Ile Phe Ile Pro Ala Leu Leu Gln Cys Ile Leu Leu Pro
                85                  90                  95
Phe Cys Pro Glu Ser Pro Arg Phe Leu Leu Ile Asn Arg Asn Glu Glu
            100                 105                 110
Asn Arg Ala Lys Ser Val Leu Lys Lys Leu Arg Gly Thr Ala Asp Val
        115                 120                 125
Thr Arg Asp Leu Gln Glu Met Lys Glu Glu Ser Arg Gln Met Met Arg
    130                 135                 140
Glu Lys Lys Val Thr Ile Leu Glu Leu Phe Arg Ser Ala Ala Tyr Arg
145                 150                 155                 160
Gln Pro Ile Leu Ile Ala Val Val Leu Gln Leu Ser Gln Gln Leu Ser
                165                 170                 175
Gly Ile Asn Ala Val Phe Tyr Tyr Ser Thr Ser Ile Phe Glu Lys Ala
            180                 185                 190
Gly Val Gln Gln Pro Val Tyr Ala Thr Ile Gly Ser Gly Ile Val Asn
        195                 200                 205
Thr Ala Phe Thr Val Val Ser Leu Phe Val Val Glu Arg Ala Gly Arg
    210                 215                 220
Arg Thr Leu His Leu Ile Gly Leu Ala Gly Met Ala Gly Cys Ala Val
225                 230                 235                 240
Leu Met Thr Ile Ala Leu Ala Leu Leu Glu Gln Leu Pro Trp Met Ser
                245                 250                 255
Tyr Leu Ser Ile Val Ala Ile Phe Gly Phe Val Ala Phe Phe Glu Val
            260                 265                 270
Gly Pro Gly Pro Ile Pro Trp Phe Ile Val Ala Glu Leu Phe Ser Gln
        275                 280                 285
Gly Pro Arg Pro Ala Ala Ile Ala Val Ala Gly Phe Ser Asn Trp Thr
    290                 295                 300
Ser Asn Phe Ile Val Gly Met Cys Phe Gln Tyr Val Glu Gln Leu Cys
305                 310                 315                 320
Gly Pro Tyr Val Phe Ile Ile Phe Thr Val Leu Leu Val Leu Phe Phe
                325                 330                 335
Ile Phe Thr Tyr Phe Lys Val Pro Glu Thr Lys Gly Arg Thr Phe Asp
            340                 345                 350
Glu Ile Ala Ser Gly Phe Arg Gln Gly Gly Ala Ser Gln Ser Asp Lys
        355                 360                 365
Thr Pro Glu Glu Leu Phe His Pro Leu Gly Ala Asp Ser Gln Val
    370                 375                 380
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<210> 4
<211> 534
<212> PRT
<213> Human

<400> 4

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Met Asp Gly Lys Ser Lys Met Gln Ala Glu Lys His Leu Thr Gly Thr
 1               5                  10                  15
Leu Val Leu Ser Val Phe Thr Ala Val Leu Gly Phe Phe Gln Tyr Gly
            20                  25                  30
Tyr Ser Leu Gly Val Ile Asn Ala Pro Gln Lys Val Ile Glu Ala His
        35                  40                  45
Tyr Gly Arg Met Leu Gly Ala Ile Pro Met Val Arg His Ala Thr Asn
    50                  55                  60
Thr Ser Arg Asp Asn Ala Thr Ile Thr Val Thr Ile Pro Gly Thr Glu
65                  70                  75                  80
Ala Trp Gly Ser Ser Glu Gly Thr Leu Ala Pro Ser Ala Gly Phe Glu
                85                  90                  95
Asp Pro Thr Val Ser Pro His Ile Leu Thr Met Tyr Trp Ser Leu Ser
            100                 105                 110
Val Ser Met Phe Ala Val Gly Gly Met Val Ser Ser Phe Thr Val Gly
        115                 120                 125
Trp Ile Gly Asp Arg Leu Gly Arg Val Lys Ala Met Leu Val Val Asn
    130                 135                 140
Val Leu Ser Ile Ala Gly Asn Leu Leu Met Gly Leu Ala Lys Met Gly
145                 150                 155                 160
Pro Ser His Ile Leu Ile Ile Ala Gly Arg Ala Ile Thr Gly Leu Tyr
                165                 170                 175
Cys Gly Leu Ser Ser Gly Leu Val Pro Met Tyr Val Ser Glu Val Ser
            180                 185                 190
Pro Thr Ala Leu Arg Gly Ala Leu Gly Thr Leu His Gln Leu Ala Ile
        195                 200                 205
Val Thr Gly Ile Leu Ile Ser Gln Val Leu Gly Leu Asp Phe Leu Leu
    210                 215                 220
Gly Asn Asp Glu Leu Trp Pro Leu Leu Leu Gly Leu Ser Gly Val Ala
225                 230                 235                 240
Ala Leu Leu Gln Phe Phe Leu Leu Leu Leu Cys Pro Glu Ser Pro Arg
                245                 250                 255
Tyr Leu Tyr Ile Lys Leu Gly Lys Val Glu Glu Ala Lys Lys Ser Leu
            260                 265                 270
Lys Arg Leu Arg Gly Asn Cys Asp Pro Met Lys Glu Ile Ala Glu Met
        275                 280                 285
Glu Lys Glu Lys Gln Glu Ala Ala Ser Glu Lys Arg Val Ser Ile Gly
    290                 295                 300
Gln Leu Phe Ser Ser Ser Lys Tyr Arg Gln Ala Val Ile Val Ala Leu
305                 310                 315                 320
Met Val Gln Ile Ser Gln Gln Phe Ser Gly Ile Asn Ala Ile Phe Tyr
                325                 330                 335
Tyr Ser Thr Asn Ile Phe Gln Arg Ala Gly Val Gly Gln Pro Val Tyr
            340                 345                 350
Tyr Ala Thr Ile Gly Val Gly Val Val Asn Thr Val Phe Thr Val Ile
        355                 360                 365
Ser Val Phe Leu Val Glu Lys Ala Gly Arg Arg Ser Leu Phe Leu Ala
    370                 375                 380
Gly Leu Met Gly Met Leu Ile Ser Ala Val Ala Met Thr Val Gly Leu
385                 390                 395                 400
Val Leu Leu Ser Gln Phe Ala Trp Met Ser Tyr Val Ser Met Val Ala
                405                 410                 415
Ile Phe Leu Phe Val Ile Phe Phe Glu Val Gly Pro Gly Pro Ile Pro
            420                 425                 430
Trp Phe Ile Val Ala Glu Leu Phe Ser Gln Gly Pro Arg Pro Ala Ala
        435                 440                 445
```

```
Ile Ala Val Ala Gly Phe Cys Asn Trp Ala Cys Asn Phe Ile Val Gly
    450                 455                 460
Met Cys Phe Gln Tyr Ile Ala Asp Leu Cys Gly Pro Tyr Val Phe Val
465                 470                 475                 480
Val Phe Ala Val Leu Leu Leu Val Phe Phe Leu Phe Ala Tyr Leu Lys
                485                 490                 495
Val Pro Glu Thr Lys Gly Lys Ser Phe Glu Glu Ile Ala Ala Ala Phe
            500                 505                 510
Arg Arg Lys Lys Leu Pro Ala Lys Ser Met Thr Glu Leu Glu Asp Leu
        515                 520                 525
Arg Gly Gly Glu Glu Ala
    530
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<210> 5
<211> 494
<212> PRT
<213> human

<400> 5

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Met Gly Thr Thr Lys Val Thr Thr Pro Leu Ile Phe Ala Ile Ser Ile
 1               5                  10                  15
Ala Thr Ile Gly Ser Phe Gln Phe Gly Tyr Asn Thr Gly Val Ile Asn
            20                  25                  30
Ala Pro Glu Ala Ile Ile Lys Asp Phe Leu Asn Tyr Thr Leu Glu Glu
        35                  40                  45
Arg Ser Glu Thr Pro Pro Ser Ser Val Leu Leu Thr Ser Leu Trp Ser
    50                  55                  60
Leu Ser Val Ala Ile Phe Ser Val Gly Gly Met Ile Gly Ser Phe Ser
65                  70                  75                  80
Val Gly Leu Phe Val Asn Arg Phe Gly Arg Arg Asn Ser Met Leu Ile
                85                  90                  95
Val Asn Leu Leu Ala Ile Ala Gly Gly Cys Leu Met Gly Phe Cys Lys
            100                 105                 110
Ile Ala Glu Ser Val Glu Met Leu Ile Leu Gly Arg Leu Ile Ile Gly
        115                 120                 125
Leu Phe Cys Gly Leu Cys Thr Gly Phe Val Pro Met Tyr Ile Gly Glu
    130                 135                 140
Ile Ser Pro Thr Ala Leu Arg Gly Ala Phe Gly Thr Leu Asn Gln Leu
145                 150                 155                 160
Gly Ile Val Ile Gly Ile Leu Val Ala Gln Ile Phe Gly Leu Lys Val
                165                 170                 175
Ile Leu Gly Thr Glu Asp Leu Trp Pro Leu Leu Leu Gly Phe Thr Ile
            180                 185                 190
Leu Pro Ala Ile Ile Gln Cys Ala Ala Leu Pro Phe Cys Pro Glu Ser
        195                 200                 205
Pro Arg Phe Leu Leu Ile Asn Arg Lys Glu Glu Glu Lys Ala Lys Glu
    210                 215                 220
Ile Leu Gln Arg Leu Trp Gly Thr Glu Asp Val Ala Gln Asp Ile Gln
225                 230                 235                 240
Glu Met Lys Asp Glu Ser Met Arg Met Ser Gln Glu Lys Gln Val Thr
                245                 250                 255
Val Leu Glu Leu Phe Arg Ala Pro Asn Tyr Arg Gln Pro Ile Ile Ile
            260                 265                 270
Ser Ile Met Leu Gln Leu Ser Gln Gln Leu Ser Gly Ile Asn Ala Val
        275                 280                 285
```

```
Phe Tyr Tyr Ser Thr Gly Ile Phe Lys Asp Ala Gly Val Gln Glu Pro
    290                 295                 300
Val Tyr Ala Thr Ile Gly Ala Gly Val Val Asn Thr Ile Phe Thr Val
305                 310                 315                 320
Val Ser Val Phe Leu Val Glu Arg Ala Gly Arg Arg Thr Leu His Leu
                325                 330                 335
Ile Gly Leu Gly Gly Met Ala Phe Cys Ser Ile Leu Met Thr Ile Ser
            340                 345                 350
Leu Leu Leu Lys Asp Asn Tyr Ser Trp Met Ser Phe Ile Cys Ile Gly
        355                 360                 365
Ala Ile Leu Val Phe Val Ala Phe Phe Glu Ile Gly Pro Gly Pro Ile
    370                 375                 380
Pro Trp Phe Ile Val Ala Glu Leu Phe Gly Gln Gly Pro Arg Pro Ala
385                 390                 395                 400
Ala Met Ala Val Ala Gly Cys Ser Asn Trp Thr Ser Asn Phe Leu Val
                405                 410                 415
Gly Leu Leu Phe Pro Ser Ala Thr Phe Tyr Leu Gly Ala Tyr Val Phe
            420                 425                 430
Ile Val Phe Thr Val Phe Leu Val Ile Phe Trp Val Phe Thr Phe Phe
        435                 440                 445
Lys Val Pro Glu Thr Arg Gly Arg Thr Phe Glu Glu Ile Thr Arg Ala
    450                 455                 460
Phe Glu Gly Gln Val Gln Thr Gly Thr Arg Gly Glu Lys Gly Pro Ile
465                 470                 475                 480
Met Glu Met Asn Ser Ile Gln Pro Thr Lys Asp Thr Asn Ala
                485                 490
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<210> 6
<211> 509
<212> PRT
<213> human

<400> 6

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Met Pro Ser Gly Phe Gln Gln Ile Gly Ser Glu Asp Gly Glu Pro Pro
 1               5                  10                  15
Gln Gln Arg Val Thr Gly Thr Leu Val Leu Ala Val Phe Ser Ala Val
            20                  25                  30
Leu Gly Ser Leu Gln Phe Gly Tyr Asn Ile Gly Val Ile Asn Ala Pro
        35                  40                  45
Gln Lys Val Ile Glu Gln Ser Tyr Asn Glu Thr Trp Leu Gly Arg Gln
    50                  55                  60
Gly Pro Glu Gly Pro Ser Ser Ile Pro Pro Gly Thr Leu Thr Thr Leu
65                  70                  75                  80
Trp Ala Leu Ser Val Ala Ile Phe Ser Val Gly Gly Met Ile Ser Ser
                85                  90                  95
Phe Leu Ile Gly Ile Ile Ser Gln Trp Leu Gly Arg Lys Arg Ala Met
            100                 105                 110
Leu Val Asn Asn Val Leu Ala Val Leu Gly Gly Ser Leu Met Gly Leu
        115                 120                 125
Ala Asn Ala Ala Ala Ser Tyr Glu Met Leu Ile Leu Gly Arg Phe Leu
    130                 135                 140
Ile Gly Ala Tyr Ser Gly Leu Thr Ser Gly Leu Val Pro Met Tyr Val
145                 150                 155                 160
Gly Glu Ile Ala Pro Thr His Leu Arg Gly Ala Leu Gly Thr Leu Asn
                165                 170                 175
```

```
Gln Leu Ala Ile Val Ile Gly Ile Leu Ile Ala Gln Val Leu Gly Leu
            180                 185                 190
Glu Ser Leu Leu Gly Thr Ala Ser Leu Trp Pro Leu Leu Leu Gly Leu
        195                 200                 205
Thr Val Leu Pro Ala Leu Leu Gln Leu Val Leu Leu Pro Phe Cys Pro
    210                 215                 220
Glu Ser Pro Arg Tyr Leu Tyr Ile Ile Gln Asn Leu Glu Gly Pro Ala
225                 230                 235                 240
Arg Lys Ser Leu Lys Arg Leu Thr Gly Trp Ala Asp Val Ser Gly Val
                245                 250                 255
Leu Ala Glu Leu Lys Asp Glu Lys Arg Lys Leu Glu Arg Glu Arg Pro
            260                 265                 270
Leu Ser Leu Leu Gln Leu Leu Gly Ser Arg Thr His Arg Gln Pro Leu
        275                 280                 285
Ile Ile Ala Val Val Leu Gln Leu Ser Gln Gln Leu Ser Gly Ile Asn
    290                 295                 300
Ala Val Phe Tyr Tyr Ser Thr Ser Ile Phe Glu Thr Ala Gly Val Gly
305                 310                 315                 320
Gln Pro Ala Tyr Ala Thr Ile Gly Ala Gly Val Val Asn Thr Val Phe
                325                 330                 335
Thr Leu Val Ser Val Leu Leu Val Glu Arg Ala Gly Arg Arg Thr Leu
            340                 345                 350
His Leu Leu Gly Leu Ala Gly Met Cys Gly Cys Ala Ile Leu Met Thr
        355                 360                 365
Val Ala Leu Leu Leu Leu Glu Arg Val Pro Ala Met Ser Tyr Val Ser
    370                 375                 380
Ile Val Ala Ile Phe Gly Phe Val Ala Phe Phe Glu Ile Gly Pro Gly
385                 390                 395                 400
Pro Ile Pro Trp Phe Ile Val Ala Glu Leu Phe Ser Gln Gly Pro Arg
                405                 410                 415
Pro Ala Ala Met Ala Val Ala Gly Phe Ser Asn Trp Thr Ser Asn Phe
            420                 425                 430
Ile Ile Gly Met Gly Phe Gln Tyr Val Ala Glu Ala Met Gly Pro Tyr
        435                 440                 445
Val Phe Leu Leu Phe Ala Val Leu Leu Leu Gly Phe Phe Ile Phe Thr
    450                 455                 460
Phe Leu Arg Val Pro Glu Thr Arg Gly Arg Thr Phe Asp Gln Ile Ser
465                 470                 475                 480
Ala Ala Phe His Arg Thr Pro Ser Leu Leu Glu Gln Glu Val Lys Pro
                485                 490                 495
Ser Thr Glu Leu Glu Tyr Leu Gly Pro Asp Glu Asn Asp
            500                 505
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<210> 7
<211> 500
<212> PRT
<213> human

<400> 7

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Met Glu Gln Gln Asp Gln Ser Met Lys Glu Gly Arg Leu Thr Leu Val
 1               5                  10                  15
Leu Ala Leu Ala Thr Leu Ile Ala Ala Phe Gly Ser Ser Phe Gln Tyr
            20                  25                  30
Gly Tyr Asn Val Ala Ala Val Asn Ser Pro Ala Leu Leu Met Gln Gln
        35                  40                  45
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Phe Pro Leu Thr Leu Leu Trp Ser Val Thr Val Ser Met Phe Pro Phe
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Gly Gly Phe Ile Gly Ser Leu Leu Val Gly Pro Leu Val Asn Lys Phe
                85                  90                  95
Gly Arg Lys Gly Ala Leu Leu Phe Asn Asn Ile Phe Ser Ile Val Pro
            100                 105                 110
Ala Ile Leu Met Gly Cys Ser Arg Val Ala Thr Ser Phe Glu Leu Ile
        115                 120                 125
Ile Ile Ser Arg Leu Leu Val Gly Ile Cys Ala Gly Val Ser Ser Asn
    130                 135                 140
Val Val Pro Met Tyr Leu Gly Glu Leu Ala Pro Lys Asn Leu Arg Gly
145                 150                 155                 160
Ala Leu Gly Val Val Pro Gln Leu Phe Ile Thr Val Gly Ile Leu Val
                165                 170                 175
Ala Gln Ile Phe Gly Leu Arg Asn Leu Leu Ala Asn Val Asp Gly Trp
            180                 185                 190
Pro Ile Leu Leu Gly Leu Thr Gly Val Pro Ala Ala Leu Gln Leu Leu
        195                 200                 205
Leu Leu Pro Phe Phe Pro Glu Ser Pro Arg Tyr Leu Leu Ile Gln Lys
    210                 215                 220
Lys Asp Glu Ala Ala Ala Lys Lys Ala Leu Gln Thr Leu Arg Gly Trp
225                 230                 235                 240
Asp Ser Val Asp Arg Glu Val Ala Glu Ile Arg Gln Glu Asp Glu Ala
                245                 250                 255
Glu Lys Ala Ala Gly Phe Ile Ser Val Leu Lys Leu Phe Arg Met Arg
            260                 265                 270
Ser Leu Arg Trp Gln Leu Leu Ser Ile Ile Val Leu Met Gly Gly Gln
        275                 280                 285
Gln Leu Ser Gly Val Asn Ala Ile Tyr Tyr Tyr Ala Asp Gln Ile Tyr
    290                 295                 300
Leu Ser Ala Gly Val Pro Glu Glu His Val Gln Tyr Val Thr Ala Gly
305                 310                 315                 320
Thr Gly Ala Val Asn Val Val Met Thr Phe Cys Ala Val Phe Val Val
                325                 330                 335
Glu Leu Leu Gly Arg Arg Leu Leu Leu Leu Leu Gly Phe Ser Ile Cys
            340                 345                 350
Leu Ile Ala Cys Cys Val Leu Thr Ala Ala Leu Ala Leu Gln Asp Thr
        355                 360                 365
Val Ser Trp Met Pro Tyr Ile Ser Ile Val Cys Val Ile Ser Tyr Val
    370                 375                 380
Ile Gly His Ala Leu Gly Pro Ser Pro Ile Pro Ala Leu Leu Ile Thr
385                 390                 395                 400
Ile Phe Leu Gln Ser Ser Arg Pro Ser Ala Phe Met Val Gly Gly Ser
                405                 410                 415
Val His Trp Leu Ser Asn Phe Thr Val Gly Leu Ile Phe Pro Phe Ile
            420                 425                 430
Gln Glu Gly Leu Gly Pro Tyr Ser Phe Ile Val Phe Ala Val Ile Cys
        435                 440                 445
Leu Ile Thr Thr Ile Tyr Ile Phe Leu Ile Val Pro Glu Thr Lys Ala
    450                 455                 460
Lys Thr Phe Ile Glu Ile Asn Gln Ile Phe Thr Lys Met Asn Lys Val
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Ser Glu Val Tyr Pro Glu Lys Glu Glu Leu Lys Glu Leu Pro Pro Val
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Thr Ser Glu Gln
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<223> primer sequence

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<213> Artificial Sequence

<220>
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Gly Val Ile Asn Ala Pro Gln Lys Val Ile Glu Ala Phe Tyr Glu Thr
35 40 45
Trp Leu Gly Arg Xaa Gly Glu Xaa Pro Ser Val Pro Thr Leu Thr Leu
50 55 60
Leu Trp Ser Leu Ser Val Ser Ile Phe Ala Val Gly Gly Met Ile Gly
65 70 75 80
Ser Phe Leu Val Gly Xaa Ile Gly Asn Arg Leu Gly Arg Lys Xaa Ala
85 90 95
Met Leu Val Asn Asn Val Leu Ala Ile Ala Gly Gly Leu Leu Met Gly
100 105 110
Leu Ala Lys Xaa Ala Xaa Ser Phe Glu Met Leu Ile Leu Gly Arg Phe
115 120 125
Ile Ile Gly Leu Tyr Cys Gly Leu Ser Ser Gly Val Val Pro Met Tyr

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    130                 135                 140
Val Gly Glu Ile Ser Pro Thr Ala Leu Arg Gly Ala Leu Gly Thr Leu
145                 150                 155                 160
Asn Gln Leu Gly Ile Val Ile Gly Ile Leu Ile Ala Gln Val Leu Gly
                165                 170                 175
Leu Asp Ser Leu Leu Gly Asn Glu Ser Leu Trp Pro Leu Leu Leu Gly
            180                 185                 190
Leu Thr Gly Val Pro Ala Leu Leu Gln Leu Leu Leu Leu Pro Phe Cys
        195                 200                 205
Pro Glu Ser Pro Arg Tyr Leu Leu Ile Asn Lys Asn Glu Glu Ala Arg
    210                 215                 220
Ala Lys Lys Ala Leu Gln Arg Leu Arg Gly Thr Ala Asp Val Ser Gln
225                 230                 235                 240
Glu Val Ala Glu Met Lys Asp Glu Ser Arg Xaa Met Xaa Ser Glu Lys
                245                 250                 255
Xaa Val Ser Val Leu Glu Leu Phe Arg Ser Arg Xaa Tyr Arg Gln Pro
            260                 265                 270
Val Ile Ile Ala Ile Val Leu Gln Leu Ser Gln Gln Leu Ser Gly Ile
        275                 280                 285
Asn Ala Val Phe Tyr Tyr Ser Thr Ser Ile Phe Glu Lys Ala Gly Val
    290                 295                 300
Gly Gln Pro Val Tyr Ala Thr Ile Gly Ala Gly Val Val Asn Thr Val
305                 310                 315                 320
Phe Thr Val Val Ser Val Phe Val Val Glu Arg Ala Gly Arg Arg Thr
                325                 330                 335
Leu His Leu Leu Gly Leu Gly Gly Met Ala Gly Cys Ala Val Leu Met
            340                 345                 350
Thr Ile Ala Leu Ala Leu Leu Asp Gln Val Pro Trp Met Ser Tyr Val
        355                 360                 365
Ser Ile Val Ala Ile Phe Gly Phe Val Ala Phe Phe Glu Val Gly Pro
    370                 375                 380
Gly Pro Ile Pro Trp Phe Ile Val Ala Glu Leu Phe Ser Gln Gly Pro
385                 390                 395                 400
Arg Pro Ala Ala Ile Ala Val Ala Gly Phe Ser Asn Trp Thr Ser Asn
                405                 410                 415
Phe Ile Val Gly Leu Leu Phe Gln Tyr Ile Ala Glu Leu Leu Gly Pro
            420                 425                 430
Tyr Val Phe Ile Val Phe Ala Val Leu Leu Leu Leu Phe Phe Ile Phe
        435                 440                 445
Thr Phe Leu Lys Val Pro Glu Thr Lys Gly Arg Thr Phe Asp Glu Ile
    450                 455                 460
Ala Ala Ala Phe Arg Lys Xaa Asn Lys Xaa Glu Gln Pro Glu Lys Glu
465                 470                 475                 480
Ser Ile Glu Glu Leu Glu Pro Leu Gly Pro Asp Glu Xaa
                485                 490
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